

## ABSTRACT

[0051] The present invention pertains to an apparatus for mixing mineral acid (e.g. sulfuric acid), and hydroxide bases (e.g. calcium hydroxide) to produce various useful mixtures (e.g. cleaning products, food production, etc.). The present invention provides an apparatus for reproducibly injecting an acid and a base to form a mixture in a controlled environment. In one aspect, the apparatus comprises a chamber having a distribution-blending-cooling dish suspended above the mixing chamber, an acid delivery system for introducing diluted acid into the chamber above the distribution-blending-cooling dish, and a base delivery system for introducing the base into the chamber by passing the base through the distribution-blending dish. The acid is injected preferentially and circumferentially to provide, enhance, and cause thorough blending. The injectors or eductors are in the mixing chamber, and the blending dish is secondary to the initial introduction of acid. The mixture is re-circulated out the bottom of the chamber and up to the distribution-blending-cooling dish along with the base.